U.S. DEPARTMENT OF ENERGY
DEPARTMENT-WIDE
FUNCTIONAL AREA QUALIFICATION STANDARD

QUALITY ASSURANCE QUALIFICATION STANDARD

Defense Nuclear Facilities Technical Personnel

U.S. Department of Energy
Washington, D.C. 20585

May 1997

Concurrence and Approval

The Assistant Secretary for Environmental Management is the Management Sponsor for the Department-wide Quality Assurance Qualification Standard. The Management Sponsor is responsible for reviewing the Qualification Standard to ensure that the technical content is accurate and adequate for Department-wide application. The Management Sponsor, in coordination with the Human Resources organization, is also responsible for ensuring that the Qualification Standard remains current. Concurrence with this Qualification Standard by the Assistant Secretary for Environmental Management is indicated by the signature below.

The Technical Personnel Program Coordinator (TPPC) is responsible for coordinating the consistent development and implementation of the Technical Qualification Program throughout the Department of Energy. Concurrence with this Qualification Standard by the Technical Personnel Program Coordinator is indicated by the signature below.

The Technical Excellence Executive Committee (TEEC) consists of senior Department of Energy managers. This Committee is responsible for reviewing and approving the Qualification Standard for Department-wide application. Approval of this Qualification Standard by the Technical Excellence Executive Committee is indicated by the signature below.

NOTE: **The signatures below reflect concurrence and approval of this Qualification Standard for interim implementation. Final concurrence and approval will occur in May 1998, pending comments received based upon implementation.**

CONCURRENCE:

_____	_____
Assistant Secretary for Environmental Management	Technical Personnel Program Coordinator

APPROVAL:

_____
Chairman
Technical Excellence Executive Committee

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U.S. DEPARTMENT OF ENERGY
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FUNCTIONAL AREA

Quality Assurance

PURPOSE

The Technical Qualification Program is divided into three levels of technical competence and qualification. The General Technical Base Qualification Standard establishes the base technical competence required of all Department of Energy defense nuclear facility technical personnel. The Functional Area Qualification Standards build on the requirements of the General Technical Base Qualification Standard and establish Department-wide functional competence requirements in each identified functional area. Office/Facility-Specific Qualification Standards establish unique operational competency requirements at the Headquarters or Field element, site, or facility level.

The Quality Assurance Functional Area Qualification Standard establishes common functional area competency requirements for all Department of Energy quality assurance technical personnel who provide management direction or oversight, impacting the safe operation of defense nuclear facilities. Satisfactory and documented completion of the competency requirements contained in this Standard ensures that technical personnel possess the minimum requisite competence to fulfill their functional area duties and responsibilities. Additionally, these competency requirements provide the functional foundation to assure successful completion of the appropriate Office/Facility-Specific Qualification Standard.

APPLICABILITY

This Standard applies to all Department of Energy quality assurance technical personnel who provide management direction or oversight impacting the safe operation of defense nuclear facilities. Personnel designated by Headquarters or Field element management as quality assurance personnel and participants in the Technical Qualification Program are required to attain the specified competency requirements of this Standard, as defined in DOE Order 360.1, Training.

IMPLEMENTATION REQUIREMENTS

The competencies contained in the Standard are divided into the following four categories:

1. General Technical
2. Regulatory
3. Administrative
4. Management, Assessment, and Oversight

Each of the categories is defined by one or more competency statements indicated by bold print. The competency statements define the expected knowledge and/or skill that an individual must meet and are requirements. Each of the competency statements is further explained by a listing of supporting knowledge and/or skill statements. **The supporting knowledge and/or skill statements are not requirements and do not necessarily have to be fulfilled to meet the intent of the competency.**

The competencies identify a familiarity level, a working level, or an expert level of knowledge; or they require the individual to demonstrate the ability to perform a task or activity. These levels are defined as follows:

> **Familiarity level** is defined as basic knowledge of or exposure to the subject or process adequate to discuss the subject or process with individuals of greater knowledge.
>
> **Working level** is defined as the knowledge required to monitor and assess operations/activities, to apply standards of acceptable performance, and to reference appropriate materials and/or expert advice as required to ensure the safety of Departmental activities.
>
> **Expert level** is defined as a comprehensive, intensive knowledge of the subject or process sufficient to provide advice in the absence of procedural guidance.
>
> **Demonstrate the ability** is defined as the actual performance of a task or activity in accordance with policy, procedures, guidelines, and/or accepted industry or Department practices.

Headquarters and Field elements shall establish a program and process to ensure that all defense nuclear facility technical personnel, required to participate in the Technical Qualification Program, meet the competency requirements contained in the appropriate Standard for their functional area. Documentation of the completion of the requirements of this Standard shall be included in the employee's training and qualification record.

In selected cases, it may be necessary to exempt an individual from completing one or more of the competencies in this Functional Area Qualification Standard. Exemptions from individual competencies shall be justified and documented in accordance with DOE Order 360.1, Training. Exemptions shall be requested by the individual's immediate supervisor, and approved one level above the individual's immediate supervisor.

Equivalencies may be granted for individual competencies based upon an objective evaluation of the employee's prior education, experience, professional certifications, and/or training. Documentation of equivalencies shall indicate how the competency requirements have been met. The supporting knowledge and/or skill statements may be considered when evaluating an individual's ability with respect to each competency requirement.

Training shall be provided to employees in the Technical Qualification Program who do not meet the competencies contained in the qualification standard. Departmental training will be based upon appropriate supporting knowledge and/or skill statements similar to the ones listed for each of the competency statements. Headquarters and Field elements should use the supporting knowledge and/or skill statements as a basis for evaluating the content of any training courses used to provide individuals with the requisite knowledge and/or skill required to meet the Qualification Standard competency statements.

DUTIES AND RESPONSIBILITIES

The following are duties and responsibilities normally expected of defense nuclear facility technical personnel assigned to the quality assurance functional area:

A. Review and evaluate the adequacy and effectiveness of Department of Energy and contractor Quality Assurance Programs, plans, and processes to ensure compliance with applicable regulations, standards, and DOE Orders.

B. Monitor and evaluate Department of Energy and contractor implementation of Quality Assurance Programs, plans, and processes to ensure adequacy, effectiveness, and compliance with applicable regulations, standards, and DOE Orders.

C. Lead/perform quality assurance assessments, document results, prepare reports and monitor resulting actions.

D. Provide an information source to Department of Energy management which is independent of line management responsibilities and of cost and schedule considerations.

E. Provide quality assurance support to accident/event investigations and perform appropriate analysis.

F. Serve as the Department of Energy's subject matter expert and/or technical point-of-contact for quality assurance activities.

G. Interface with Department of Energy Headquarters and Field elements, regulators, and stakeholders to ensure effective application of Department of Energy quality assurance documents.

H. Support Department of Energy Organizations in the development of Quality Assurance Programs and Implementation Plans.

Additional duties and responsibilities specific to the site, facility, operational activities, and/or the involved organizations shall be contained in the Office/Facility-Specific Qualification Standard(s).

BACKGROUND AND EXPERIENCE

The U.S. Office of Personnel Management's Qualification Standards Handbook establishes minimum education, training, experience, or other relevant requirements applicable to a particular occupational series/grade level, as well as alternatives to meeting specified requirements.

The preferred education and experience for quality assurance personnel is:

1. Education:

   Bachelor of Science degree in engineering or a related discipline; or meet the alternative requirements specified for engineers or scientists in the Qualifications Standards Handbook.

2. Experience:

   Industry, military, Federal, state or other directly related background that has provided specialized experience in quality assurance. Specialized experience may be demonstrated through possession of the competencies outlined in this Standard.

In addition to the education and experience stated above, a national Lead Auditor Certification (e.g., NQA-1 and ASQC), Certified Quality Engineer (CQE), or Certified Quality Manager (CQM) are recommended, and typically may serve as the basis for equivalency for competencies in the Section 1, “General Technical” and Section 4, “Management, Assessment and Oversight” sections of this Standard.

REQUIRED COMPETENCIES

The competencies contained in this Standard are distinct from those competencies contained in the General Technical Base Qualification Standard. All quality assurance personnel must complete the competency requirements of the General Technical Base Qualification Standard prior to or in parallel with the completion of the competency requirements contained in this Standard. Each of the competency statements defines the level of expected knowledge and/or skill that an individual is required to possess to meet the intent of this Standard. **The supporting knowledge and/or skill statements further describe the intent of the competency statements but are not requirements.**

1. GENERAL TECHNICAL

NOTE: When Department of Energy (DOE) directives are referenced in the Qualification Standard, the most recent version should be used.

1.1 Quality assurance personnel shall demonstrate a working level knowledge of testing and inspection techniques and methods.

Supporting Knowledge and/or Skills

a. Describe the use of dimensional measurement devices (e.g., proper instruments used for degree of accuracy required, temperature, cleanliness, and calibration effects on instruments as well as work pieces).

b. Discuss the basic operating principles of the following:

- Nondestructive examination (NDE) methods such as visual, radiography, magnetic particle, liquid penetrant, ultrasonic, and eddy current
- Destructive examination methods such as pull test, spectral analysis, and hardness tests
- Control of non-conforming material and processes as the result of tests and inspections

c. Discuss the advantages, disadvantages, and inherent limitations of destructive and nondestructive examination methods.

d. Describe commonly used testing methods, such as:

- Electrical
- Mechanical
- Chemical
- Soil and concrete

1.2 Quality assurance personnel shall demonstrate a working level knowledge of inspection and test planning methodology.

Supporting Knowledge and/or Skills

a. Discuss the criteria/logic used to determine critical characteristics which need to be verified through inspection (i.e., operational and design requirements) and testing.

b. Describe the merits of inspection at source, receipt, in-process, and final stages.

c. Compare the advantages and disadvantages of inspection by item attributes versus inspection of process variables.

1.3 Quality assurance personnel shall demonstrate a working level knowledge of metrology and calibration systems.

Supporting Knowledge and/or Skills

a. Discuss the use of primary, secondary, and working standards.

b. Discuss the purpose and application of calibration systems with respect to:

- Process/product quality
- Accuracy
- Precision

c. Discuss the requirements for calibration programs contained in the following:

- 10 CFR 830.120, Quality Assurance, Part (c) (2) (i) and (iv) and DOE Order 5700.6C, Criterion 8, regarding control of measurement and test equipment
- NQA-1-1994, Quality Assurance Requirements for Nuclear Facility Applications, Basic Requirement 12 (with appropriate Supplements and Appendices), regarding control of measurement and test equipment

d. Discuss the components of an effective calibration recall system.

e. Discuss the importance of calibration traceability.

f. Discuss why an error analysis is important in determining the accuracy of complex measuring/ test equipment and how to conduct an error analysis on complex measuring and test equipment.

g. Discuss methods for determining a proper calibration interval.

1.4 Quality assurance personnel shall demonstrate a working level knowledge of suspect and counterfeit items.

Supporting Knowledge and/or Skills

a. Describe how weaknesses in the following programs might allow suspect and counterfeit items to enter DOE facilities:

- Engineering
- Procurement
- Quality Assurance

b. Discuss the types of items that have been identified by DOE as being counterfeit or presenting concerns to DOE.

c. Discuss the methods used to identify suspect and counterfeit items.

d. Discuss the suspect and counterfeit item controls and reporting requirements contained in DOE Order 440.1, Worker Protection Management for DOE Federal and Contractor Employees.

e. Describe the policy on the continued use of suspect and counterfeit items in DOE facilities including:

- Potential worker hazards
- Engineering analysis

- Cost benefit considerations

f. Discuss the following as it applies to suspect/counterfeit fasteners in cranes:

- Determination of critical load path for various lifting devices (e.g., overhead, jib, and mobile)
- Corrective action when a suspect/counterfeit fastener is identified in or out of the critical load path

g. Using real or hypothetical information, discuss the process/approach used to evaluate a vendor.

h. Discuss the suspect/counterfeit item reporting requirements in DOE Order 232.1, Occurrence Reporting and Processing of Operations Information.

1.5 Quality assurance personnel shall demonstrate a familiarity level knowledge of maintenance management practices.

Supporting Knowledge and/or Skills

a. Define each of the following maintenance-related terms and explain their relationship to each other:

- Corrective
- Planned
- Preventive
- Reliability-centered
- Predictive

b. Describe the elements of an effective work control program and the documentation used to control maintenance.

c. Discuss the importance of maintaining a proper balance of preventive and corrective maintenance.

d. Identify typical maintenance performance indicators, and discuss their importance.

e. Discuss the relationship between maintenance and Conduct of Operations, Quality Assurance, and Configuration Management.

f. Discuss the requirements for the receipt and inspection of parts, materials, and equipment.

g. Describe the difference between temporary and permanent repairs/work and the requirements and controls to prevent inadvertent modifications.

1.6 Quality assurance personnel shall demonstrate a familiarity level knowledge of statistical process control and statistical sampling procedures.

Supporting Knowledge and/or Skills

a. Define the following statistical terms and their inter-relationships:

- Mean
- Median
- Mode
- Variance
- Mean variance
- Standard deviation

b. Explain the structure of a normal density function or Gaussian distribution bell curve.

c. Describe the structure of an exponential distribution or a log normal distribution.

d. Describe in general, the following sampling procedures:

- Simple random sampling
- Stratified sampling
- Cluster sampling
- Systematic sampling
- Acceptance sampling

e. Discuss the terms "confidence interval" and "confidence limit."

f. Discuss how the control chart is the key instrument of statistical process control and how causes of variation in processes can be determined.

2. REGULATORY

NOTE: When Department of Energy (DOE) directives are referenced in the Qualification Standard, the most recent version should be used.

2.1 Quality assurance personnel shall demonstrate a working level knowledge of appropriate quality assurance policies, programs, processes, and requirements contained in:

- **DOE Order 5700.6C, Quality Assurance**
- **10 CFR 830.120, Quality Assurance**
- **Price-Anderson Amendments Act Indemnification**

Supporting Knowledge and/or Skills

a. Describe the purpose, interrelationships and importance of DOE Policy 450.4, Safety Management System Policy, DOE Order 5700.6C, Quality Assurance and 10 CFR 830.120, Quality Assurance.

b. Describe the DOE and contractor's responsibilities and requirements for implementing a Quality Assurance Program (QAP).

c. Discuss the purpose of the Implementation Plan and its relationship to the Quality Assurance Program.

d. Discuss the process for obtaining an exemption to DOE Order 5700.6C, Quality Assurance and 10 CFR 830.120, Quality Assurance.

e. Describe the requirements of DOE Order 5700.6C, Quality Assurance and 10 CFR 830.120, Quality Assurance which address the following:

- Management
- Performance
- Assessment

f. Describe the purpose and scope of the Price-Anderson Amendments Act and its applicability to the Department’s quality assurance activities.

g. Referring to G-830.120-Rev 0, Implementation Guide for use with 10 CFR 830.120, Quality Assurance, discuss the implementation of an effective Quality Assurance Program (QAP).

2.2 Quality assurance personnel shall demonstrate a working level knowledge of the application of appropriate consensus standards to Quality Assurance Program implementation.

Supporting Knowledge and/or Skills

a. Describe the general relationship of the following documents to Department of Energy (DOE) quality assurance requirements:

- American Society of Quality Control (ASQC)-E4, Quality Assurance Program Requirements for Environmental Programs
- NQA-1-1994, Quality Assurance Requirements for Nuclear Facility Applications
- ASQC Q9001, Quality Management and Quality Assurance Standards Series
- 10 CFR 50, Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants
- American Society of Mechanical Engineers (ASME) Pressure Vessel Codes
- DOE/RW/0333P, Quality Assurance Requirements and Description
- ISO 14001, Environmental Management System

b. Describe the relationship of consensus standards adopted by DOE and contractor organizations to the DOE quality requirements; and, any enhancements to the standards that are necessary to meet DOE requirements.

c. Describe the specifications and guidelines provided in ASQC-E4 for data collection and data quality programs.

d. Discuss the ASQC Q9001 series standards.

e. Discuss the applicability of 10 CFR 50, Appendix B quality assurance requirements to DO E programs.

2.3 Quality assurance personnel shall demonstrate a working level knowledge of the Quality Assurance Program (QAP) requirements identified in Department of Energy (DOE) and contractor quality assurance documents.

Supporting Knowledge and/or Skills

a. Describe the purpose and elements of an effective Quality Assurance Program (QAP).

b. Discuss line management's responsibilities for the QAP and Implementation Plan.

c. Describe the graded approach for application of quality requirements.

d. Discuss stop work authority as its relates to:

- Origin of stop work authority
- Intended purpose
- Legal implications

e. Discuss the circumstances which would support developing individual QAPs or combining similar work under a single QAP.

2.4 Quality assurance personnel shall demonstrate a working level knowledge of Department of Energy (DOE) Order 425.1, Startup and Restart of Nuclear Facilities and its application to quality assurance activities.

Supporting Knowledge and/or Skills

a. Discuss the purpose, scope, and applicability of DOE Order 425.1, Start-up and Restart of Nuclear Facilities.

b. Define the following terms as they relate to DOE Order 425.1, Start-up and Restart of Nuclear Facilities, and nuclear safety:

- Facility shutdown
- Operational readiness review
- Plan-of-action
- Prestart finding
- Readiness assessment
- Unplanned shutdown

c. Discuss the role of Department quality assurance personnel involved in the startup and restart of nuclear facilities with respect to the implementation of the requirements of DOE Order 425.1, Start-up and Restart of Nuclear Facilities.

2.5 Quality assurance personnel shall demonstrate a working level knowledge of Department of Energy (DOE) Order 232.1, Occurrence Reporting and Processing of Operations Information.

Supporting Knowledge and/or Skills

a. State the purpose of DOE Order 232.1, Occurrence Reporting and Processing of Operations Information.

b. Define the following terms:

- Event
- Condition
- Facility
- Notification Report
- Occurrence Report
- Reportable Occurrence

c. Discuss the Department's policy regarding the reporting of occurrences as outlined in DOE Order 232.1, Occurrence Reporting and Processing of Operations Information.

d. State the different categories of reportable occurrences and discuss each.

e. Discuss the notification requirements associated with each of the categories of reportable occurrences and any associated time requirements. At a minimum, include the following in the discussion:

- Notification Report
- 10-Day Occurrence Report
- Final Report
- Closing out and verifying Occurrence Reports
- Processing Occurrence Reports which cross lines of professional responsibility

- Contractor Occurrence Reporting Procedures

f. Discuss the general process for preparing and submitting occurrence reports and their follow-up.

g. Using Attachment 1 to DOE Order 232.1, Occurrence Reporting and Processing of Operations Information, discuss the role of quality assurance personnel related to reportable occurrences.

h. Given an occurrence report, determine the following:

- The adequacy of the review process used
- That causes were appropriately defined
- That corrective actions addressed causes
- That the lessons learned were appropriate
- That corrective actions have been completed

i. Using an occurrence report, identify and discuss the factors contributing to the occurrence.

2.6 Quality assurance personnel shall demonstrate a familiarity level knowledge of transportation and safety requirements for radioactive and hazardous materials in Department of Energy (DOE) Order 460.1, Packaging and Transportation Safety.

Supporting Knowledge and/or Skills

a. Discuss the purpose and scope of the DOE Order 460.1, Packaging and Transportation Safety.

b. Discuss the applicability and impact of DOE Order 460.1, Packaging and Transportation Safety, in relation to quality assurance activities.

c. Describe the authorities and responsibilities of quality assurance personnel with respect to DOE Order 460.1, Packaging and Transportation Safety.

2.7 Quality assurance personnel shall have a familiarity level knowledge of life cycle asset management requirements for defense nuclear facilities.

Supporting Knowledge and/or Skills

a. Discuss the implementation requirements for DOE Order 430.1, Life-Cycle Asset Management, at defense nuclear facilities.

b. Define the following terms:

- Life-cycle
- Physical asset
- Strategic system
- Line item project
- Value engineering

c. Discuss the application of DOE Order 430.1, Life Cycle Assessment Management requirements for the following:

- Asset management performance measures
- Physical asset acquisition
- Operation and maintenance of physical assets
- Disposition of physical assets

d. Discuss the responsibilities and authorities for implementing the requirements of DOE Order 430.1, Life Cycle Assessment Management.

e. Describe the relationship and application of the following standards:

- Standards/Requirements Identification Documents (S/RIDs)
- Work Smart Standards

2.8 Quality assurance personnel shall demonstrate a familiarity level knowledge of the Department of Energy (DOE) operational configuration management program.

Supporting Knowledge and/or Skills

a. Describe the purpose and objectives of the Operational Configuration Management Program.

b. Discuss the following elements of the contractor's Configuration Management Plan:

- Program planning
- Equipment scope criteria
- Concepts and terminology
- Interfaces
- Databases
- Procedures

c. Discuss the following elements of the Configuration Management Program:

- Design requirements
- Document control
- Change control
- Assessments
- Design reconstitution adjunct
- Material condition and aging adjunct

d. Discuss the purpose, concepts, and general process for applying the graded approach to operational configuration management.

3. ADMINISTRATIVE

NOTE: When Department of Energy (DOE) directives are referenced in the Qualification Standard, the most recent version should be used.

3.1 Quality assurance personnel shall demonstrate a working level knowledge of channels to maintain communication with Headquarters, field elements, and the public.

Supporting Knowledge and/or Skills

a. Identify the various internal and external groups with whom quality assurance personnel must interface in the performance of their duties.

b. Describe the Department's organization and discuss the Department's procedures for communicating between elements.

c. Describe the Department's procedures and policy for communicating with regulatory agencies and other stakeholders.

3.2 Quality Assurance personnel shall demonstrate the ability to effectively communicate (both oral and written) with the contractor, stakeholders, and other internal and external organizations.

Supporting Knowledge and/or Skills

a. Demonstrate written communication skills as applicable in the development of:

- Assessment reports
- Technical reports
- Technical papers
- Quality Assurance Program and Implementation Plan
- Work process documents (e.g., procedures)

b. Demonstrate effective and appropriate communications skills when providing specific work or task directions to contractors.

3.3 Quality assurance personnel shall demonstrate a familiarity level knowledge of the management requirements related to compliance with administrative regulations and standards.

Supporting Knowledge and/or Skills

a. Discuss the following as they relate to the requirements for an adequate program, which implementation standards to use, and which techniques to use for assessing adequacy:

- Document preparation and control
- Records management
- Management systems
- Procurement

- Scheduling and cost control

b. Discuss the management requirements contained in DOE Order 1324.5B, Records Management Program.

3.4 Quality assurance personnel shall demonstrate a familiarity level knowledge of the training and qualification program requirements identified in the following Department of Energy (DOE) Directives:

- **DOE Order 5480.20A, Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities**
- **DOE Standard 1070-94, Guidelines for Evaluation of Nuclear Facility Training Programs**
- **DOE Order 360.1, Training**

Supporting Knowledge and/or Skills

a. Discuss the meaning of "qualification" and its importance to quality.

b. Describe the purpose and scope of DOE Order 5480.20A, Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities.

c. Discuss why certain skills or proficiencies should be demonstrated periodically.

d. Describe the types of changes to a program or process that require modification to a training program.

e. Using a copy of DOE-STD-1070-94, discuss the training program evaluation process in terms of:

- Benefits of evaluations
- Evaluator qualifications
- Evaluation methods
- Evaluation frequency
- Graded approach

4. MANAGEMENT, ASSESSMENT AND OVERSIGHT

NOTE: When Department of Energy (DOE) directives are referenced in the Qualification Standard, the most recent version should be used.

4.1 Quality assurance personnel shall demonstrate a working level knowledge of assessment techniques.

Supporting Knowledge and/or Skills

a. Describe the assessment requirements applicable to the Department of Energy and contractor organizations.

b. Explain the essential elements of assessments, the differences between management and independent assessments and the role of quality assurance personnel relative to the two assessment types.

c. Describe the fundamental differences between performance and compliance based assessments.

d. Describe the contents of a typical assessment report.

e. Explain the essential elements and processes associated with the following assessment activities:

- Plan and schedule
- Management of the Assessment Team
- Communicating team findings
- Analyzing data and determination of overall performance
- Conduct of exit interviews
- Closure process, tracking to closure, and follow up
- Corrective action implementation

f. Participate in formal meetings between Department management and senior contractor management to discuss results of quality assurance assessments.

g. Discuss the ethical responsibilities of quality assurance personnel.

4.2 Quality assurance personnel shall demonstrate a working level knowledge of problem analysis principles and techniques necessary to identify problems, determine potential causes of problems, and identify corrective action(s).

Supporting Knowledge and/or Skills

a. Describe the application of effective problem analysis principles and techniques.

b. Describe the application of root cause analysis processes in the performance of corrective actions.

c. Compare and contrast immediate, short term, and long term actions taken as the result of an identified problem or occurrence.

d. Describe various data gathering techniques and the use of trending and history when analyzing problems.

4.3 Quality assurance personnel shall demonstrate the ability to trend performance.

Supporting Knowledge and/or Skills

a. Discuss the key process methodology used in the trending and analysis of operations information.

b. Using an actual list of performance measures, determine what type of assessments should be performed and in what areas.

c. Given a set of assessment report data for a specified period, analyze the information for quality trends or compliance problems.

4.4 Quality assurance personnel shall demonstrate the ability to conduct independent assessments of the contractor's Quality Assurance Program (QAP) in accordance with applicable quality assurance requirements and standards.

Supporting Knowledge and/or Skills

a. Discuss the means for determining the adequacy and effectiveness of a work activity being assessed.

b. Discuss the criteria used by line management to determine the significance of issues or observations.

c. Describe possible assessment alternatives when actual work activities cannot be observed.

d. Discuss the assessment team member qualification requirements.

e. Describe the benefits of a user friendly surveillance program.

f. Participate in a review of the Quality Assurance Program (QAP) in accordance with applicable requirements and standards.

g. Participate in a readiness review prior to major scheduled or planned work in order to assess the following areas:

. Work prerequisites established
. Quality assurance procedures are adequate
. Personnel have been trained and qualified
. Proper material and resources are available

4.5 Quality assurance personnel shall demonstrate the ability to oversee the effective implementation of appropriate quality assurance criteria.

Supporting Knowledge and/or Skills

a. Describe the goals, objectives, and methods used to conduct effective oversight of quality assurance activities contained in 10 CFR 830.120, Quality Assurance Implementation Guide.

b. Evaluate the organizational effectiveness in conforming to selected elements of the Quality Assurance Program (QAP)/Inspection Program (IP) such as:

- Management assessment
- Quality improvement
- Implementation Plan actual performance to schedule performance
- Corrective action

c. Discuss the reporting techniques for communicating evaluation results to Department and contractor management.

4.6 Quality assurance personnel shall demonstrate a working level knowledge of problem analysis principles used to identify problems, determine potential causes of problems, and identify corrective action(s).

Supporting Knowledge and/or Skills

a. Describe and explain the application of problem analysis techniques including the following:

- Root cause analysis
- Causal factor analysis
- Change analysis
- Barrier analysis
- Management Oversight Risk Tree (MORT) analysis

b. Describe and explain the application of the following root cause analysis processes in the performance of occurrence investigations:

- Event and causal factors charting
- Root cause coding
- Recommendation generation

c. Describe and explain the application of the following in accident/event investigations:

- DOE Order 225.1, Accident Investigations
- DOE Order 231.1, Environment, Safety, and Health Reporting

d. Using event and/or occurrence data, apply problem analysis techniques and identify the problems and how they could have been avoided.

4.7 Quality assurance personnel shall demonstrate a familiarity level knowledge of program and project management.

Supporting Knowledge and/or Skills

a. Explain the purpose of project management as it relates to quality assurance activities.

b. Describe typical documents and data sources utilized in project management.

c. Identify and explain the major elements of a project, and discuss their relationship.

d. Explain the purpose, and use of a Project Execution Plan (PEP).

e. Discuss the role of configuration management as it relates to project management.

f. Describe the purpose and use of work packages and/or planning packages.

g. Describe the purpose of schedules, and discuss the use of milestones and activities.

h. Describe the requirements for project/program files and documentation.

EVALUATION REQUIREMENTS

The following requirements shall be met to complete the Department-wide Quality Assurance Functional Area Qualification Standard. The evaluation process identified below serves as a measurement tool for assessing whether the participants have acquired the technical competencies outlined in this Standard.

1. Documented completion of the Department-wide General Technical Base Qualification Standard in accordance with the requirements contained in that Standard.

2. Documented completion of the competency requirements listed in this Functional Area Qualification Standard. Documentation of the successful completion of these competency requirements may be satisfied by a qualifying official using any of the following methods:

   - Documented evaluation of equivalencies
   - Written examination
   - Documented oral evaluation
   - Documented observation of performance

CONTINUING TRAINING AND PROFICIENCY REQUIREMENTS

Quality assurance personnel shall participate in an Office/facility/position-specific continuing training and qualification program that includes the following elements:

1. Technical education and/or training covering topics directly related to the duties and responsibilities of quality assurance personnel as determined by management. This may include courses and/or training provided by:

   - Department of Energy
   - Other government agencies
   - Outside vendors
   - Educational institutions

2. Training covering topics that address identified deficiencies in the knowledge and/or skills of quality assurance personnel.

3. Training in areas added to the Quality Assurance Functional Area Qualification Standard since initial qualification.

4. Specific continuing training requirements shall be documented in Individual Development Plans (IDPs).

5. Participation in activities required to maintain proficiency or certifications (e.g., conducting/participating in audits, surveillances, Operational Readiness Reviews, etc.) is encouraged.